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Cannabis-induced psychotic-like experiences are predicted by high schizotypy. Confirmation of preliminary results in a large cohort.

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Keywords

induced, results, cannabis, preliminary, confirmation, schizotypy, high, predicted, experiences, cohort, like, large, psychotic

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Cannabis-Induced Psychotic-Like Experiences Are Predicted by High Schizotypy

Confirmation of Preliminary Results in a Large Cohort

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Key Words
Cannabis · Schizotypy · Psychosis-like experiences

Abstract
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Introduction

Cannabis increases both the risk of relapse and the severity of symptoms in individuals already diagnosed as having schizophrenia [1, 2]. According to some researchers [3, 4], cannabis use also significantly increases the risk of developing a psychotic disorder in individuals without

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any history of illness. It is nevertheless methodologically difficult to establish whether people who are prone to psychosis are drawn to cannabis use (an association model), or whether cannabis use truly increases the incidence of psychotic experiences (a causal model) [3–5]. However, data from 3 recently reported studies favour the latter model, since early cannabis use, predating any self-reported psychosis-like symptoms, appears to be a risk factor for later psychosis [6–8].

To further explore the relationship between cannabis use and psychosis vulnerability, researchers have turned to the use of self-report measures of schizotypy in non-clinical samples as an index of psychosis proneness. Recent studies have, for example, reported that cannabis users have higher schizotypy scores than non-users [9–12] and that current users have higher schizotypy scores than past users [13]. Whilst of some interest, such studies are generally limited by their failure to record the rich and varied phenomenological experiences of respondents. Yet cannabis use has long been associated with an increase in the reporting of 'psychosis-like' experiences for certain individuals [14, 15] and Verdoux et al. [16] showed that psychosis vulnerability and cannabis use were independently associated with unusual perceptual experiences. More recently, Henquet et al. [17] have reported that early psychosis-like experiences increase the likelihood of subsequent 'psychotic states' following cannabis use, an effect possibly mediated by genetic differences in the sensitivity to the principal active ingredient Δ9-tetrahydrocannabinol [18].

In 2003, we began to work on the development of a self-report questionnaire that would enable cannabis users to quickly record psychological (and some somatic) effects experienced both as they smoked cannabis and for some time after use. The upshot was the Cannabis Experiences Questionnaire (CEQ); the substantive part of which has remained unchanged since its inception, comprising checklists of concurrent and after-effect experiences that respondents can endorse using a 5-point Likert scale. Previously, we reported preliminary findings of relationships between high schizotypy and negative (psychosis-like) and amotivational-syndrome-like after-effect experiences in this journal [19]. Since then 3 new independent samples have completed both the CEQ and the brief Schizotypal Personality Questionnaire (SPQB) [20], and we now report findings based on the pooled data from these. As in our pilot study, we expected to find associations between higher schizotypy scores and an increased reporting of negative and after-effect experiences of cannabis.

Method

Three 'new' independent samples form our pooled cohort; as follows:

(1) a Manchester student sample (n = 219; 80 males and 139 females);
(2) a Dutch young person sample (n = 165; 104 males and 61 females);
(3) a test-retest sample comprising a mix of UK students and non-student adults (n = 93; 32 males and 61 females).

A range of recruitment procedures was employed in order to optimise the sample sizes in each instance. For sample 1, notices were posted around the university campus inviting interested individuals to contact a researcher for further information about the study. A participant information sheet was then provided, along with copies of the CEQ and SPQB. The respondents were asked to complete both as fully and honestly as possible in their own time. An anonymisation procedure ensured that the respondents were identifiable only by a PIN and password. Completed questionnaires were to be returned to a labelled postbox placed in a communal area of the campus or to be posted to the researcher in a pre-paid envelope. Sample 2 was recruited predominantly by college email. Students received a 'pop-up' message inviting them to visit a website where they could learn more about the study and complete electronic versions of the 2 questionnaires. Additional non-student respondents were recruited by asking the participants to invite friends and siblings to complete hard copies of each questionnaire to be mailed back to the study coordinator. Once again, the use of a PIN and password ensured respondent anonymity. Sample 3 was similarly recruited with a mix of electronic contact of students and word-of-mouth recruitment of non-student adults (>21 years of age) through various social network groupings including a mothers and babies group, a film/book club and a hiking club. Summary demographic information about these samples is provided in table 1. Overall, our pooled cohort comprised 477 respondents, of whom 332 (70%) had at least 1 experience of using cannabis. The participants did not receive any financial compensation for taking part in the study.

Measures

Schizotypy. The participants completed the SPQB, a 22-item questionnaire consisting of the most reliable items taken from the longer Schizotypal Personality Questionnaire [21]. The questionnaire was presented as a personality assessment with the following instructions: 'Please answer each item by ticking one of the two boxes (Yes or No) to the right of each statement/question. Answer all items even if unsure of your answer. When you have finished, check over each one again to make sure you have indicated Y or N to each statement/question.' The SPQB provides a total score and scores on 3 subscales: 'disorganized' (SPQB-D), 'cognitive-perceptual' (SPQB-CP) and 'interpersonal' (SPQB-I).

Cannabis Experiences. Items were identified for inclusion in early versions of the CEQ through a combination of literature search, perusal of journal and web-based descriptions of cannabis intoxication/psychosis [22–24] and personal qualitative accounts from cannabis users. Subsequent pilot testing prompted minor changes both to the list of items to be included and the means of endorsing these items. The current CEQ comprises 2 checklists to record concurrent (43 items) and after-effects (12 items) associated with cannabis use that the respondent can endorse using a

Table 1. Sample demographics

Sample/cohort	Subjects	Mean age years	Male:female ratio	Ever used cannabis?	Current or past user?	Date recruited
Manchester student sample	219	22.8	80:139	yes: 147 (67) no: 72 (33)	not recorded	May 2004
Dutch young people sample	165	20.8	104:61	yes: 120 (73) no: 45 (27)	74 current 46 past	2006
Test-retest sample	93	22.7	32:61	yes: 65 (70) no: 28 (30)	40 current 25 past	July 2006
Combined cohort	477	22.1	216 M 261 F	yes: 332 (70) no: 145 (30)		

Figures in parentheses are percentages.

5-point Likert scale ranging from 'hardly ever or never applies' [1] to 'almost always or always applies' [5]. The concurrent experiences checklist effectively merges 2 clusters of experiences which we have previously referred to as positive (pleasurable) and negative (psychosis-like) experiences. Examples of positive items include 'having enhanced perceptual awareness' and 'being able to understand the world better'. The cumulative scores on this subscale can range from 18 to 90. The negative concurrent items chiefly comprise psychological experiences that might preferably be avoided, 'feeling paranoid' and 'fearful of going mad' being 2 such examples. For this subscale the scores can range from 25 to 125. The after-effects subscale attempts to quantify the consequences of cannabis post-use and consists of items associated with the 'amotivational syndrome' commonly reported in habitual users [25], e.g. 'not wanting to do anything' or 'feeling generally slowed down'. The scores on this scale could range from 12 to 60. The instructions relating to the completion of each checklist were as follows:

Concurrent experiences: 'How often do you have/have you had these experiences while *smoking* cannabis?'

After-effects: 'How often have you had/did you have these experiences *after* the initial effects of cannabis had worn off but which you feel are nevertheless directly related to recent use of cannabis?'

Cannabis Use. The participants were asked how often (every day, more than once a week, about once a week, about once a month, a few times each year, about once a year, only once or twice, never) and when they smoked cannabis (during the morning, during the day, during the evening, frequently during the day and night). Information about other drugs used for recreational purposes was also sought in samples 1 and 2 (though not for sample 3). However, samples 2 and 3 were additionally asked a series of questions about the preferred strength (of cannabis), number of times ever used and weekly expenditure (on cannabis), which together provide a proxy of cannabis consumption.

Procedure

We should emphasise that as part of the questionnaire development, the samples described above actually completed slightly different versions of the CEQ: the student sample completed the original version [19] save for the inclusion of a structured section on other drug use; the Dutch sample completed a translated Dutch version which additionally attempted to quantify the volume of consumption of cannabis, and the test-retest sample completed a version that also assessed the consumption of cannabis but not of other recreational drugs. However, it is important to note that in all cases, the substantive Likert scale checklists of cannabis experiences were unchanged.

Data analysis was performed using SPSS (version 12.0.1). Non-normally distributed data were transformed as appropriate, and differences between groups were tested with t tests or analysis of variance. Within groups, Pearson's coefficient was used to establish the size of correlation. In all cases the 0.05 level of significance (2-tailed) was used. The study had full ethical approval (both in Manchester, UK, and Deventer, the Netherlands).

Results

Seventy percent of our pooled cohort reported having used cannabis at least once, and from samples 2 and 3 it would appear that the majority [114/185 (62%)] are current users. The frequency of use for current and past users combined [310/332 complete data sets] was recoded into 4 bands as follows: a few times each week, 16% (50/310); a few times each month, 38% (117/310); a few times each year, 40% (126/310); less than once a year, 5.5% (17/310). There were no significant gender differences in the rates of cannabis use. The modal age for first use was 15 (mean = 15 years 5 months; SD = 2.08), although >5% had tried cannabis by the age of 12. As the mean age at recruitment was 22 years 5 months (SD = 5.68), most respondents had been using cannabis at least intermittently for about 7 years at the time of assessment. Most users consumed cannabis in the evenings (41%) with friends (67%). However, from samples 2 and 3 it appears that the expenditure on cannabis is modest: more than half

(56.5%) spend GBP 2.50 (EUR 4) per week or less on the drug.

From samples 1 and 2 it is apparent that for slightly more than half (139/267) of the cannabis users, cannabis was the only (illegal) drug used (although 76% consumed alcohol on at least an occasional basis). For the remainder (n = 128) the number of other illicit drugs used varied between 1 (41% of the sample) and 10 (0.7% of the sample). The drugs of choice (listed according to the frequency of reporting) included ecstasy (26%), magic mushrooms (25%), amphetamine (17%), cocaine (17%), LSD (13%), poppers (7%) and ketamine (4%). The drugs which were used by <2% of the participants included solvents, GHB, nutmeg, benzodiazepines, MDA, opiates and barbiturates. Ten respondents who reported using other drugs (LSD, cocaine and morphine) but not cannabis were included in the analyses reported below as non-cannabis users. There were no significant differences in any demographic measures between cannabis-only users and poly-users, with the exception that the latter group were more likely to be frequent cannabis users ($\chi^2 = 23.06$, $p < 0.01$).

The SPQB means and SD (in brackets) for the pooled cohort were as follows: SPQB-CP: 3.63 (3.97), SPQB-I: 4.01 (3.92), SPQB-D: 2.48 (2.90) and for the SPQB total score 10.13 (10.22). The SPQB total scores required logarithmic transformation and each of the subscales needed inverse transformation prior to statistical analysis. There were no significant differences between those who reported having used cannabis and those who had not on the SPQB total or any of the SPQB subscales (all $p > 0.05$). However, amongst users, greater regularity of consumption was associated with both higher SPQB subscale scores (SPQB-CP: $F = 8.65$, d.f. = 3, 305, $p < 0.001$; SPQB-I: $F = 6.61$, d.f. = 3, 305, $p < 0.001$; SPQB-D: $F = 5.26$, d.f. = 3, 305, $p = 0.001$, and SPQB total: $F = 7.66$, d.f. = 3, 305, $p < 0.001$). Age at first use was not correlated significantly with any of the SPQB measures. Moreover, there were no significant differences on any of the SPQB measures between cannabis-only users and poly-users.

Relationship between SPQB Scores and CEQ Subscales

Amongst the cannabis users (n = 332; 70%) the means (with SD in brackets) for the subscales from the CEQ were as follows: pleasurable experiences = 42.26, (12.25), psychosis-like experiences = 43.99 (13.88) and after-effects = 22.87 (9.16). [These bear comparison with those described in our pilot study of 39.94 (9.94) for pleasurable experiences, 43.12 (12.98) for psychosis-like experiences and 22.71 (9.31) for after-effects.] In each case, the distribution of data was approximately normal. Bivariate correlational analyses were performed in line with the stated hypotheses. These indicated significant correlations between the psychosis-like experiences subscale and the SPQB-D subscale ($r = 0.320$, $p < 0.001$), the SPQB-CP subscale ($r = 0.327$, $p < 0.001$), the SPQB-I subscale ($r = 0.299$, $p < 0.001$) and the SPQB total score ($r = 0.333$, $p < 0.001$). The after-effects subscale was also correlated with the SPQB-D subscale ($r = 0.315$, $p < 0.001$), the SPQB-CP subscale ($r = 0.293$, $p < 0.001$), the SPQB-I subscale ($r = 0.265$, $p < 0.001$) and the SPQB total score ($r = 0.306$, $p < 0.001$). All significant correlations would have survived a Bonferroni-corrected α level of 0.0125. The pleasurable experiences subscale was not significantly correlated with any SPQB scores. An almost identical pattern of correlations (between the SPQB and CEQ scales) was apparent when cannabis-only and poly-users were considered separately, indicating that our decision to pool data from these 2 subgroups was justified.

Exploratory Factor Analysis of CEQ Checklist Data

We combined the data set from this investigation with that from the pilot study reported on previously to provide a single merged file comprising 614 respondents, of whom 431 were positive for cannabis use. (Pooling generated a sample to meet the requirements of exploratory factor analysis). Current and after-effect data were also pooled (as cannabis-related experiences) and subjected to principal component analysis with Varimax rotation. Inspection of the resultant variance table and scree plot combined suggested a 3-factor solution. Inspection of the rotated component matrix indicated that factor 1 (23% of total variance) represented a psychotic-dysphoric dimension which overlapped with our psychosis-like scale but also included several affective/discomfort items. Factor 2 (11% of variance) comprised items from across the CEQ and could be characterised as an 'intoxicated' dimension. Factor 3 (6% of variance) exclusively covered selective items from the pleasurable experiences scale and could be characterised as an 'expansive-positive' index. In view of the exploratory nature of this analysis, in table 2 we identify only the items making a unique factor loading of at least 0.5.

The psychotic-dysphoric scale is of interest in the context of this report as the 14 items 'loading' on it (at least 0.5) are those that might reasonably be expected from any psychoto-mimetic and dysphoric effects of cannabis. These items were subject to a reliability analysis generating a Cronbach's α coefficient of 0.908, without any item appearing to undermine this high level of internal reliability. A further scale was therefore generated based on the cumulative score of just these 14 items; called the psy-

Table 2. Rotated component matrix of concurrent and after-effects

Factor 1 'psychotic-dysphoric' (Cronbach's α = 0.907)	Factor 2 'intoxicated' (Cronbach's α = 0.881)	Factor 3 'expansive' (Cronbach's = 0.877)
Feeling anxious (0.723)	Feeling generally slowed down (AE) (0.804)	Feeling more creative (0.736)
Fearful that you are going mad (0.669)	Do not want to do anything (AE) (0.779)	Full of plans (0.709)
Suspicious without reason (AE) (0.664)	Feeling that your thinking has been slowed down (AE) (0.742)	Full of ideas (0.705)
Feeling like you no longer know yourself (0.656)	Cannot concentrate (AE) (0.678)	Ecstatic (0.688)
Paranoid without reason (AE) (0.655)	Have reduced attention (AE) (0.665)	Able to understand the world better (0.654)
Paranoid (0.651)	Loss of motivation (AE) (0.653)	Energized (0.648)
Nervy (0.634)	Slowing of time (AE) (0.592)	Enhanced perceptual awareness (0.640)
Depressed (0.580)	Sleepy (0.525)	Rapid flow of thoughts (0.565)
Fearful (0.572)	Lethargic (0.515)	Looking for excitement (0.538)
Hearing things others do not hear (auditory hallucinations) (0.570)		Feeling excited (0.519)
Things not feeling right on your skin (0.567)		Feeling like you could do anything (0.511)
Disturbed in your thinking (0.563)		Powerful (0.509)
Feeling depersonalised (AE) (0.528)		
Sad (0.519)		

Factor loadings of 0.5 or larger are shown in descending order of magnitude. AE = Item from the after-effect checklist. All other items are from the positive/negative concurrent experiences checklist.

chotic-dysphoric score. The bivariate correlations between this score (inverse transformed) and the transformed SPQB scores were as follows: with SPQB-CP, r = 0.345; with SPQB-I, r = 0.243; with SPQB-D, r = 0.311, and with SPQB -total, r = 0.350 (all significant at $p < 0.001$ with $n_{minimum} = 388$). However, a high psychotic-dysphoric score per se was not predicted by frequency of use ($F < 1$, d.f. = 3, 305, n.s.). Schizotypy was also correlated more modestly with the intoxicated factor score (which evinced a Cronbach α of 0.881): with SPQB-CP, r = 0.208; with SPQB-I, r = 0.182; with SPQB-D, r = 0.251, and with SPQB total, r = 0.300 (also all significant at $p < 0.001$ with $n_{minimum} = 388$). However, as with the psychotic-dysphoric score, the intoxicated factor score was not predicted by frequency of use ($F < 1$, d.f. = 3, 305, n.s.). The expansive factor score also showed good internal reliability (Cronbach's α = 0.877) but did not correlate significantly with any of the schizotypy measures.

Present versus Past Cannabis Users

The individuals in samples 2 and 3 could indicate whether they were current (n = 114) or past (n = 71) users of cannabis. These groups did not differ significantly in terms of frequency of use, nor on any SPQB measure, but there was a highly significant interaction between group and cannabis experiences (F = 10.73, d.f. = 1, 178, p = 0.001), with current users reporting more positive and fewer negative experiences than past users.

Discussion

The main finding from this investigation is that we have been able to replicate the results from our pilot study [19] to show significant correlations between schizotypy and certain types of negative concurrent and after-effect experiences associated with cannabis use, though not with positive-expansive experiences related to the drug.

Our main hypotheses have therefore been supported in a much larger pooled cohort. Moreover, the 'stepped' modifications to the CEQ made since our initial study do not seem to have undermined its ability to 'capture' the core psychological sequalae of cannabis use.

As in our pilot study, reported cannabis use was comparatively high (overall 70%, compared with 72% in our pilot study). The heterogeneity and size of our pooled cohort suggest that our previous findings could not simply be attributed to the vagaries of student life in Manchester, UK. Our present cohort additionally comprised 150 young Dutch people and at least 50 non-student UK adults. It would thus seem that cannabis use remains widespread despite recent media campaigns (in the UK at least) to expose its attendant dangers. On the other hand, only 16% (50/310) reported using cannabis more frequently than once a week, and almost half the sample (46%; 143/310) indicated using it once a month or less. The expenditure per week on acquiring cannabis was also typically modest (EUR <4), reinforcing the view that many of our respondents might be considered occasional rather than habitual users. For them, smoking cannabis would seem, for the most part, an innocuous and socially accepted activity to be enjoyed with friends. The failure to find a trend of increased negative experiences with increased frequency of use is also of interest in this context: Such experiences may be important in the psychosis proneness debate which we revisit below, but they are relatively uncommon and clearly not simply a consequence of greater exposure to the drug.

In common with our pilot study but contrary to previous research [9–12] we did not find that cannabis users had significantly higher schizotypy scores than non-users. However, reported use was higher (70%) than in all other studies that *have* found an association (typically <30% usage). Moreover, amongst users, greater frequency of use *is* clearly associated with higher schizotypy. So despite the comparatively high rate of cannabis consumption in our samples, the increased reporting of psychosis-like experiences in cannabis users with high schizotypy scores broadly supports the findings of others [16, 17].

The question of whether respondents are current or past users may also be germane to this matter. Of the 185 individuals responding to this question (only samples 2 and 3 were asked) the current users reported more positive and fewer negative experiences than the former users (the levels of after-effects were similar in both groups). One interpretation of this interaction is that people continue to use cannabis because they enjoy its expansive effects. An alternative explanation is that some people stop using cannabis because they do not like the elevated levels of negative psychotic-like effects. Invited written comments from a number of past users tend to support the latter explanation. One wrote: 'I used to smoke cannabis regularly until one occasion when a friend and me (sic) shared some "weed" and I felt uneasy, agitated, paranoid … that I was going mad … for several days after …'

She understandably found this experience frightening and has remained abstinent ever since.

Apart from the observation that poly-drug users also consume cannabis more frequently, there were no other clear-cut differences between this group and cannabis-only users, either in relation to basic demographics or schizotypy, or in the pattern of interrelationships between the CEQ and SPQB measures. This finding is reassuring but not altogether surprising in view of the explicit instructions heading each of the CEQ checklists, which ask the respondent to endorse only effects related to concurrent or recent cannabis use.

The exploratory factor analysis of current and after-effect experiences provides an interesting alternative way of interpreting CEQ responses. This analysis was conducted on the total merged cohort from both the present and pilot studies to provide a suitably large sample of 431 individuals positive for cannabis use. We deemed a 3-factor solution optimal because, although several other factors had eigenvalues of >1, these tended to have only 1 or 2 loading items and, critically, were to the right of the scree plot dogleg. To further explore the factors we employed a conservative criterion factor loading of 0.5, which identified 14 items loading on factor 1 (psychotic-dysphoric), 9 loading on factor 2 (intoxicated) and 12 loading on factor 3 (expansive), all of which showed high internal reliability (table 2). Predictably, factor 3 comprised items exclusively drawn from (positive) current experiences, whereas items loading on factors 1 and 2 encompassed both current and after-effect experiences. If a researcher is hoping to quantify typical concurrent and after-effect cannabis experiences, the original scales (positive, negative and after-effects) may suffice. However, if the researcher intends to identify individuals evincing the most pathological pattern of cannabis experiences, s/he may prefer to focus on items contributing to factor 1. We note that of all the summary scores drawn from the CEQ in our final pooled data set, the psychotic-dysphoric score generated the most robust correlations with schizotypy and may represent the best index of psychosis vulnerability in cannabis users.

As in our pilot study, a limitation of the current study is that the participants were not screened for the presence

(or family history) of psychiatric illnesses: either might reasonably be predicted to be associated with higher negative and after-effect scores on the CEQ, but our ethical approval did not extend to recording this information. Similarly, in terms of psychopathological traits, we have thus far deliberately restricted our interest to the obvious candidate of schizotypy. Other measures also now merit attention, some of which correlate closely with schizotypy (such as delusion and hallucination proneness [26, 27]) and others which correlate less closely (such as trait anxiety [28]) or that may be independent (such as sensation seeking [29]). A further procedural concern is that the overall structure of the CEQ (though not the vital checklists) varied somewhat from sample to sample, as we sought to refine and improve the effectiveness of the self-report measure as a psychometric tool. A final caveat is that some participants may have mistakenly indicated responses on the SPQB that actually reflected their experiences with cannabis: for example endorsing SPQB item 7 about 'needing to be on (my) guard even with friends' because they sometimes 'felt apprehensive of others' when using cannabis. This seems unlikely in view of the specific instructions relating to the completion of each questionnaire (coupled with the explicit descriptions of the SPQB and CEQ as a general personality measure and a drug usage/reaction measure, respectively, in the information sheet) but cannot be entirely ruled out. Additional instructions regarding the completion of the SPQB may be appropriate in subsequent studies.

Our findings lend weight to our earlier suggestion that individuals who have high schizotypy scores and who report psychotic-like responses to cannabis may represent a group at elevated risk for psychosis. However, it is important to remember that this study is essentially correlational in nature. Most cannabis users seem able to use the drug with relative impunity, and some who sense danger signs may decide to stop. Moreover, it is widely acknowledged that most individuals with high levels of trait schizotypy do not 'convert' to full-blown psychosis [10]. Our findings merely suggest that high schizotypes who use cannabis are more likely to report psychotic and dysphoric experiences related to its consumption, and such individuals may be at increased risk of developing psychosis in the future. Δ9-Tetrahydrocannabinol, the principal active ingredient in cannabis [30], binds to cannabinoid receptors localized in the prefrontal cortex, basal ganglia and hippocampus [31], where it has a dopamine agonist action [32, 33]. The heightened sensitivity of dopamine systems observed in acute schizophrenia [34] may also be present to some degree along the psychosis continuum [e.g. 35]. Δ9-Tetrahydrocannabinol given to healthy volunteers is known to produce psychotic-like symptoms when administered intravenously [36] or to produce a 'psychosis prodrome state' following oral administration [37]. An increased sensitivity to it [17] would explain why high scoring schizotypes who use cannabis are more likely to have psychosis-like experiences and pronounced after-effects than their low scoring counterparts. However, a large-scale longitudinal study would be required in order to establish whether such individuals are more likely than others to develop a psychotic illness at some point in the future.

The CEQ has been revised several times since the inception of this research programme. The current version includes the same concurrent and after-effect checklists as we used in our previously reported pilot study (save for minor changes to the wording of items) but additionally records information about the pattern and history of use/consumption and other drug use. All told, it has now been used successfully in 4 separate studies comprising >600 respondents. It appears to be an acceptable and useful instrument which is quick and easy to complete and which generates reliable quantitative data capturing most of the frequently reported subjective experiences linked to cannabis use. We are happy to make a copy of this questionnaire available to interested parties on request.

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